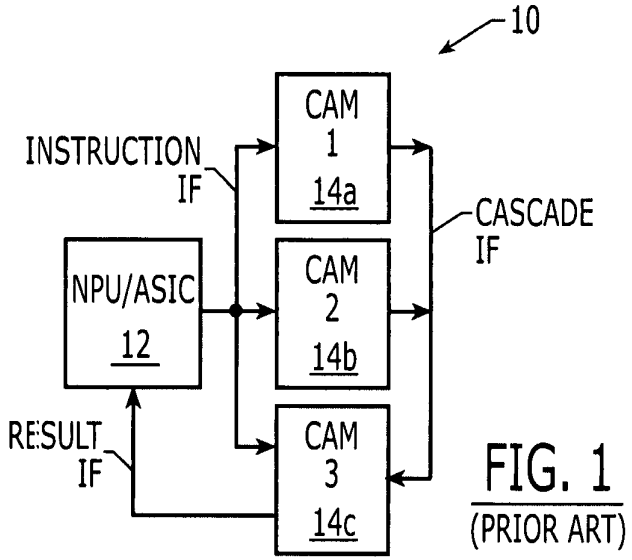

FIG. 1
(PRIOR ART)

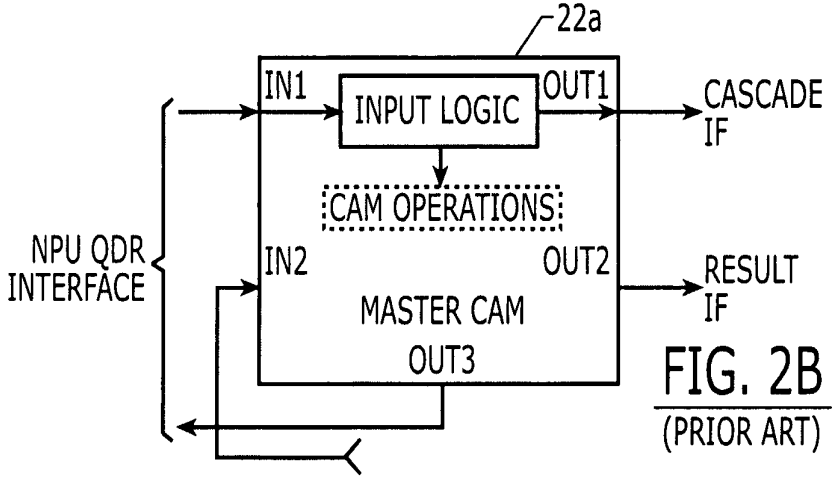

FIG. 2B
(PRIOR ART)

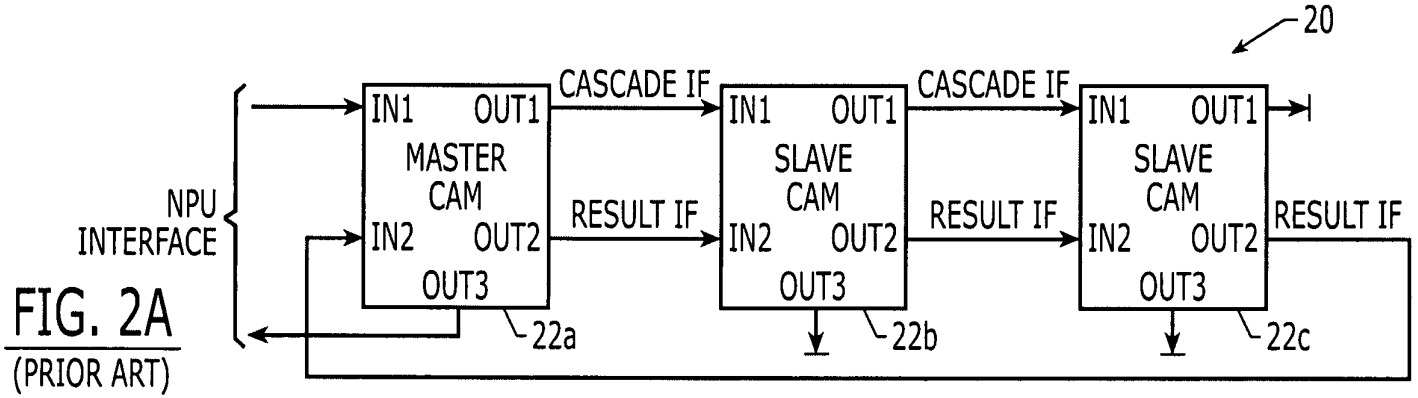

FIG. 2A
(PRIOR ART)

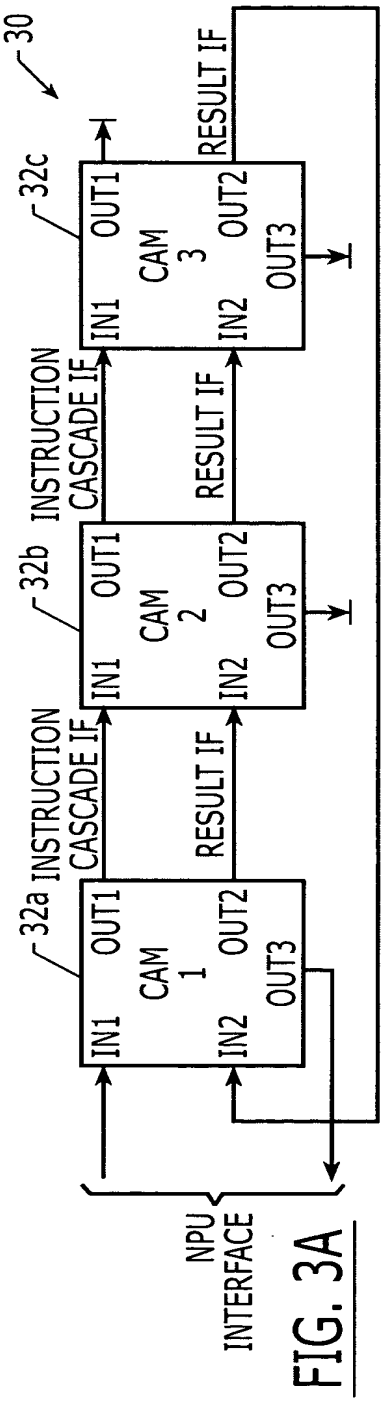
30
32a
32b
32c
CAM 1
CAM 2
CAM 3
IN1
IN2
OUT1
OUT2
OUT3
INSTRUCTION CASCADE IF
RESULT IF
NPU INTERFACE

FIG. 3A

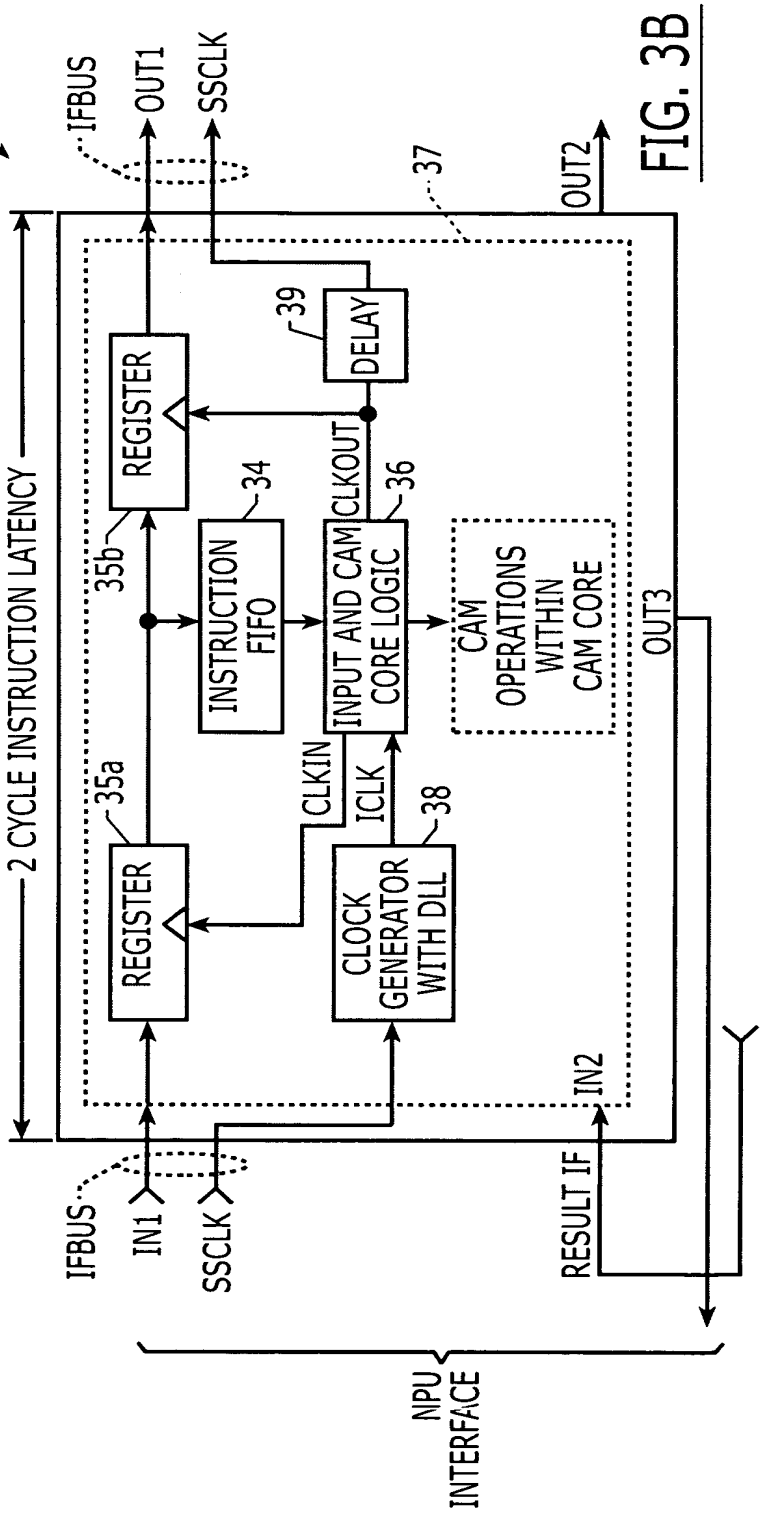
32a
IFBUS
OUT1
SSCLK
OUT2
37
2 CYCLE INSTRUCTION LATENCY
REGISTER
35b
39
DELAY
INSTRUCTION FIFO
34
INPUT AND CAM CORE LOGIC
CLKOUT
36
CAM OPERATIONS WITHIN CAM CORE
OUT3
REGISTER
35a
CLKIN
ICLK
CLOCK GENERATOR WITH DLL
38
IN1
IN2
RESULT IF
NPU INTERFACE

FIG. 3B

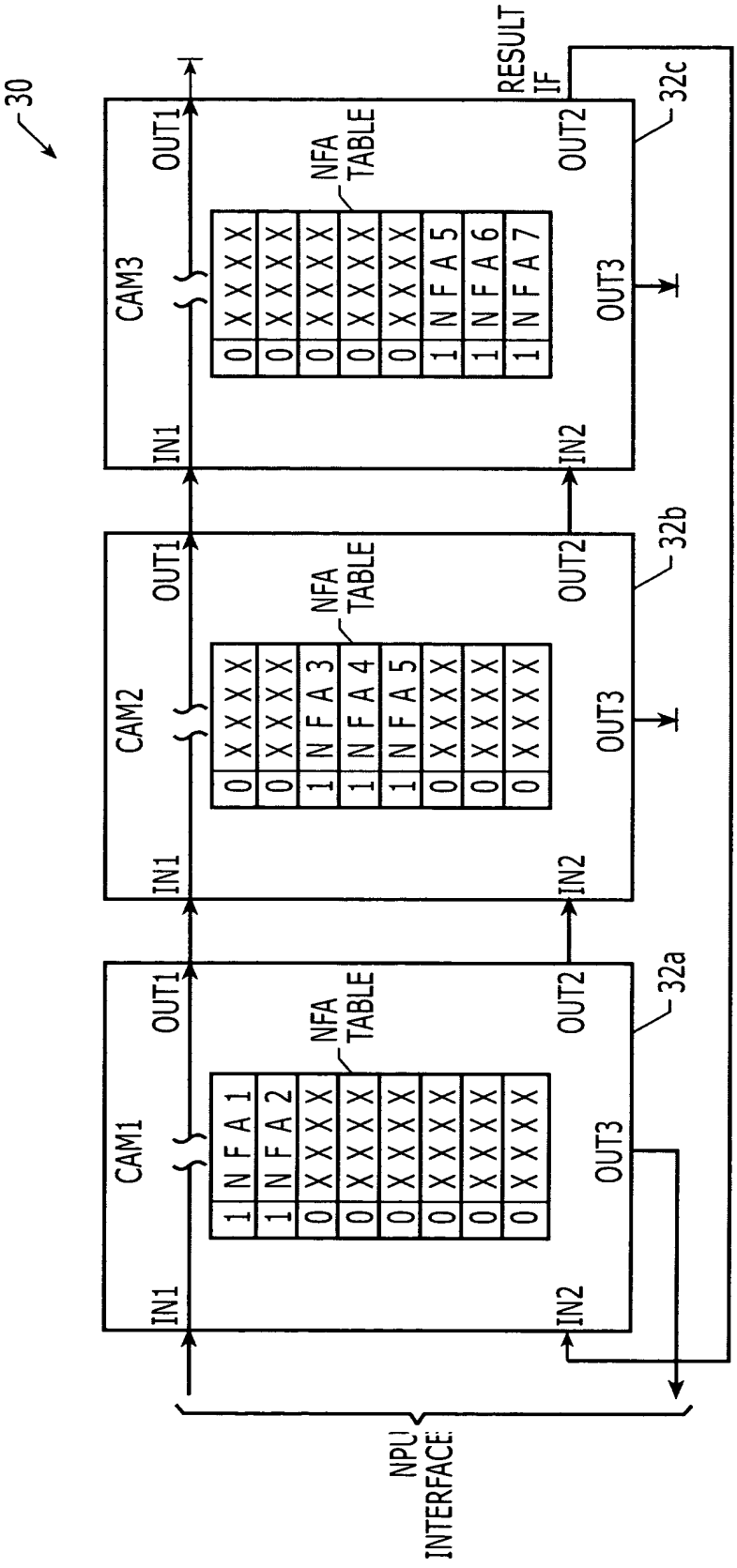
30
CAM1
CAM2
CAM3
IN1
IN2
OUT1
OUT2
OUT3
NFA TABLE
RESULT IF
32a
32b
32c
NPU INTERFACE
1 N F A 1
1 N F A 2
1 N F A 3
1 N F A 4
1 N F A 5
1 N F A 6
1 N F A 7
0 X X X X

FIG. 3C

DATABASE	VALID BIT	NEXT FREE ADDRESS
DB1	V1	NFA 1
DB2	V2	NFA 2
DB3	V3	NFA 3
DB4	V4	NFA 4
DB5	V5	NFA 5
DB6	V6	NFA 6
DB7	V7	NFA 7
DB8	V8	NFA 8
DB9	V9	NFA 9
DB10	V10	NFA 10
DB11	V11	NFA 11
DB12	V12	NFA 12
DB13	V13	NFA 13
DB14	V14	NFA 14
DB15	V15	NFA 15
DB16	V16	NFA 16

NFA TABLE

FIG. 3D

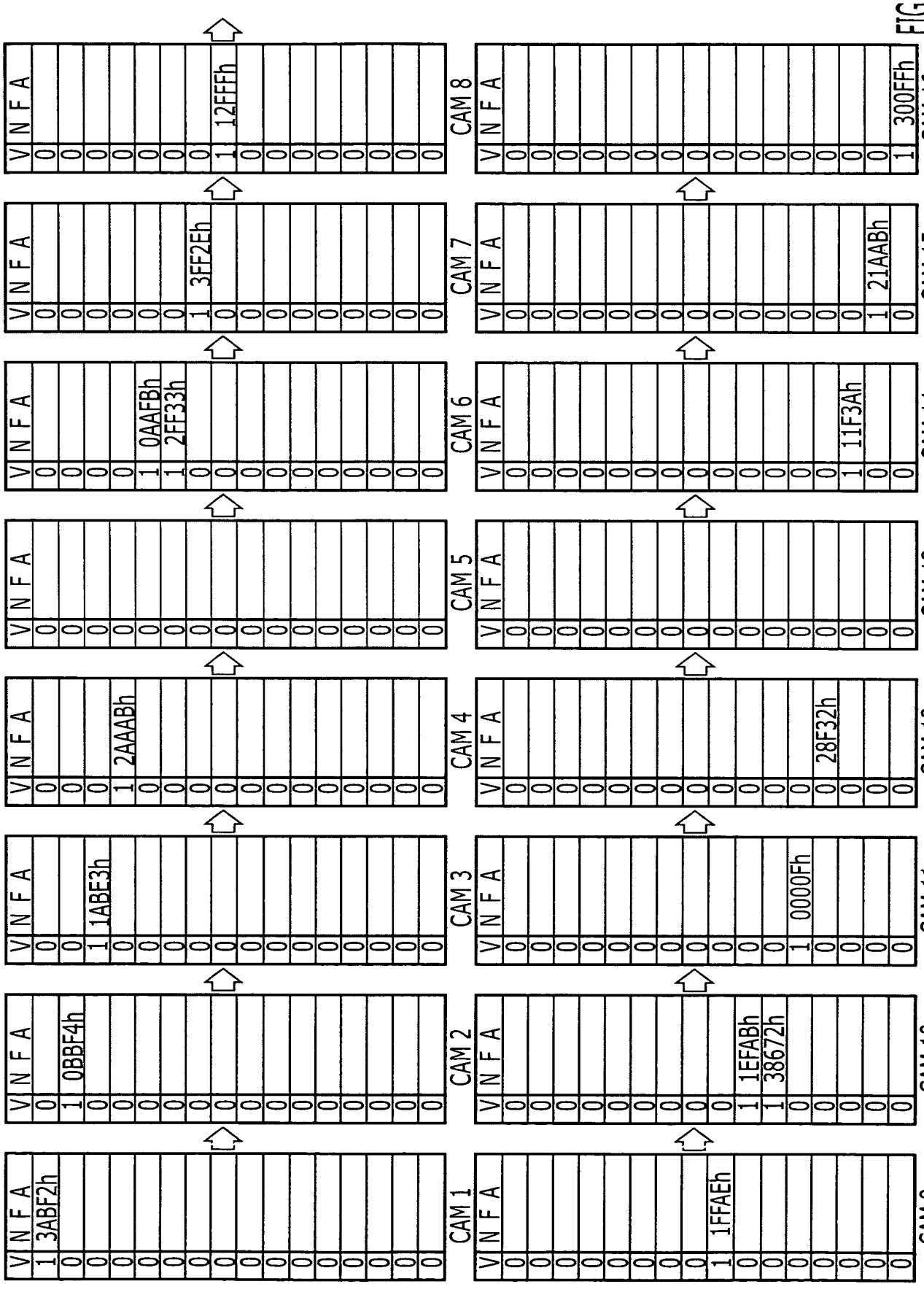
CAM 1
CAM 2
CAM 3
CAM 4
CAM 5
CAM 6
CAM 7
CAM 8
CAM 9
CAM 10
CAM 11
CAM 12
CAM 13
CAM 14
CAM 15
CAM 16
V N F A
1 3ABF2h
1 0BBF4h
1 1ABE3h
1 2AAABh
1 0AAEBh
1 2FF33h
1 3FF2Eh
1 12EFFh
1 1FFAEh
1 1EFABh
1 38672h
1 0000Fh
1 28F32h
1 11F3Ah
1 21AABh
1 300FFh

FIG. 4A

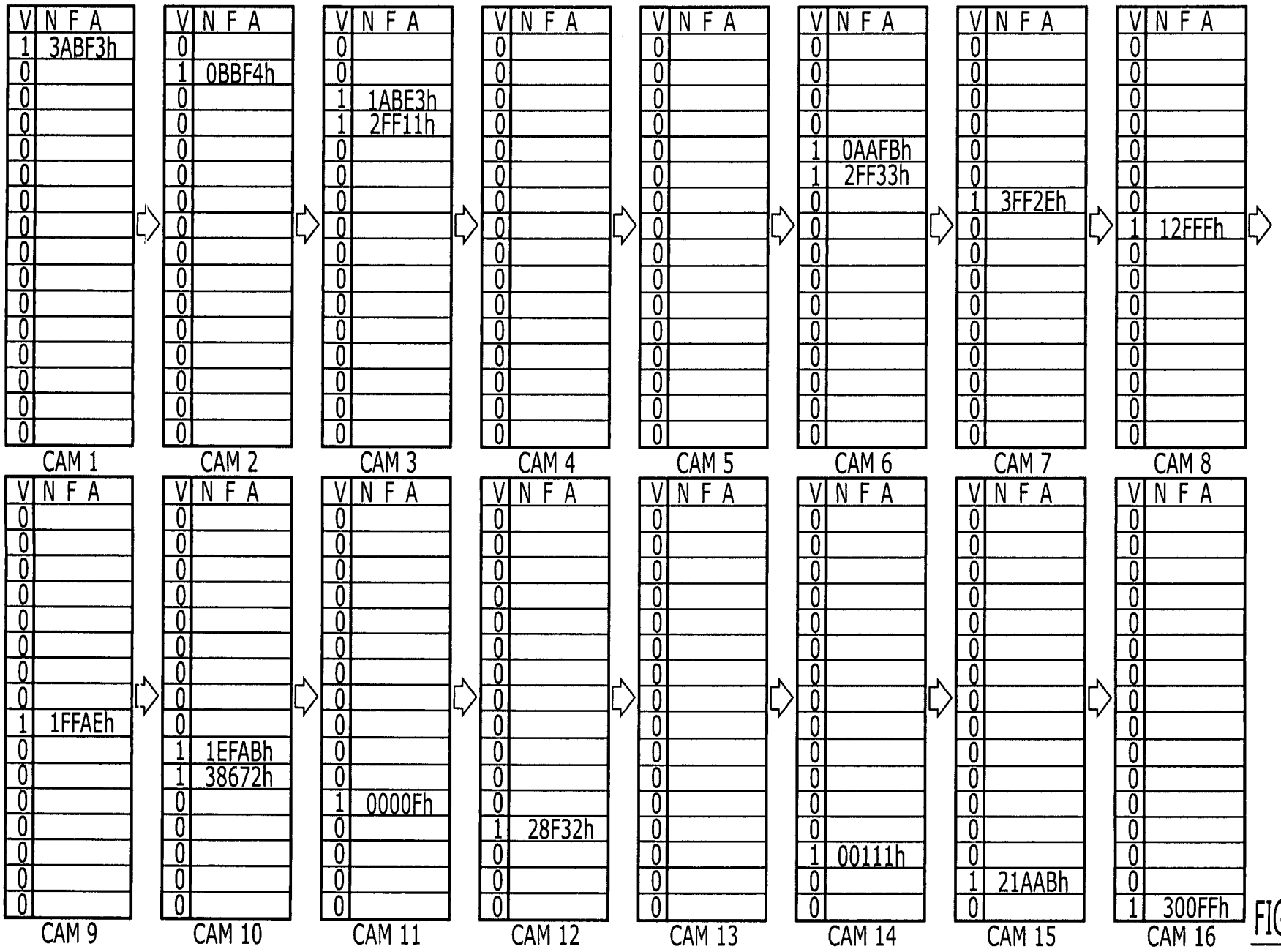
V N F A
1 3ABF3h
CAM 1
V N F A
1 0BBF4h
CAM 2
V N F A
1 1ABE3h
1 2FF11h
CAM 3
V N F A
CAM 4
V N F A
CAM 5
V N F A
1 0AAFBh
1 2FF33h
CAM 6
V N F A
1 3FF2Eh
CAM 7
V N F A
1 12FFFh
CAM 8
V N F A
1 1FFAEh
CAM 9
V N F A
1 1EFABh
1 38672h
CAM 10
V N F A
1 0000Fh
CAM 11
V N F A
1 28F32h
CAM 12
V N F A
CAM 13
V N F A
1 00111h
CAM 14
V N F A
1 21AABh
CAM 15
V N F A
1 300FFh
CAM 16

FIG. 4B

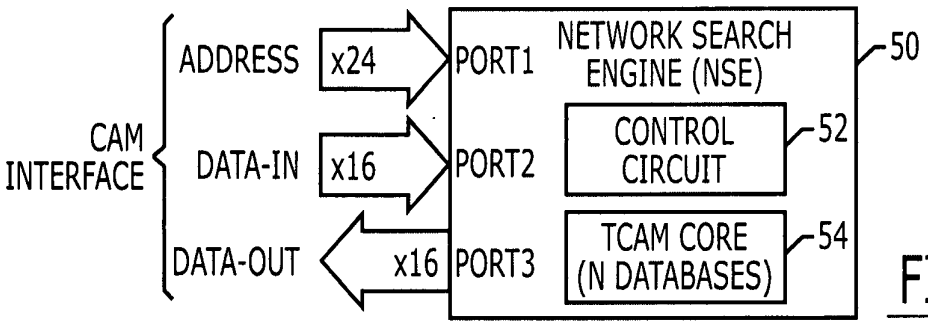
CAM INTERFACE
ADDRESS
x24
DATA-IN
x16
DATA-OUT
x16
PORT1
PORT2
PORT3
NETWORK SEARCH ENGINE (NSE)
50
CONTROL CIRCUIT
52
TCAM CORE (N DATABASES)
54

FIG. 5

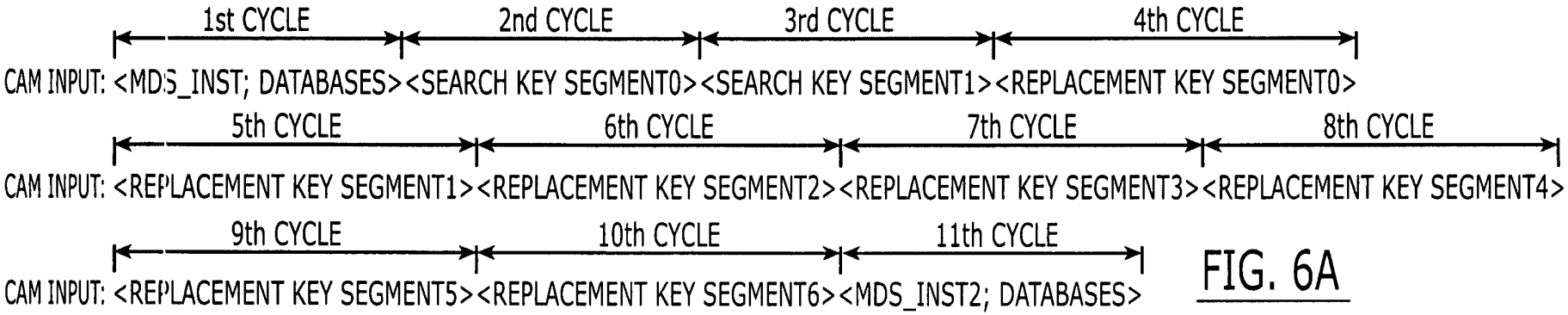
1st CYCLE
2nd CYCLE
3rd CYCLE
4th CYCLE
CAM INPUT: <MDS_INST; DATABASES><SEARCH KEY SEGMENT0><SEARCH KEY SEGMENT1><REPLACEMENT KEY SEGMENT0>
5th CYCLE
6th CYCLE
7th CYCLE
8th CYCLE
CAM INPUT: <REPLACEMENT KEY SEGMENT1><REPLACEMENT KEY SEGMENT2><REPLACEMENT KEY SEGMENT3><REPLACEMENT KEY SEGMENT4>
9th CYCLE
10th CYCLE
11th CYCLE
CAM INPUT: <REPLACEMENT KEY SEGMENT5><REPLACEMENT KEY SEGMENT6><MDS_INST2; DATABASES>

FIG. 6A

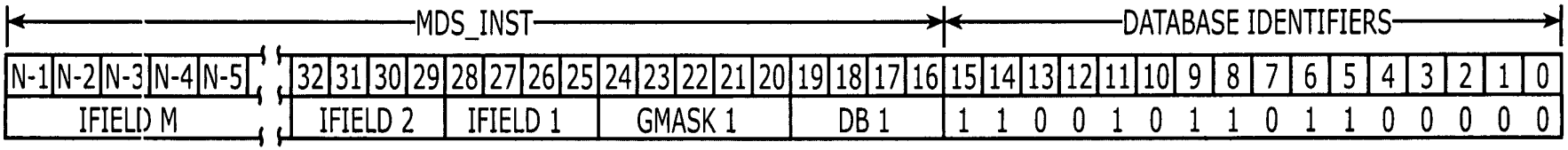

FIG. 6B

SEARCH NO.	SEARCH KEY	+	GLOBAL MASK	⇒	SEARCH WORD	DATABASE
1	<KEY SEGMENT0><KEY SEGMENT1>	+	GMASK1	⇒	SEARCH WORD 1	3
2	<REPLACEMENT SEGMENT0><KEY SEGMENT1>	+	GMASK2	⇒	SEARCH WORD 2	5
3	<REPLACEMENT SEGMENT1><KEY SEGMENT1>	+	GMASK3	⇒	SEARCH WORD 3	6
4	<REPLACEMENT SEGMENT2><KEY SEGMENT1>	+	GMASK4	⇒	SEARCH WORD 4	8
5	<REPLACEMENT SEGMENT3><KEY SEGMENT1>	+	GMASK5	⇒	SEARCH WORD 5	9
6	<REPLACEMENT SEGMENT4><KEY SEGMENT1>	+	GMASK6	⇒	SEARCH WORD 6	11
7	<REPLACEMENT SEGMENT5><KEY SEGMENT1>	+	GMASK7	⇒	SEARCH WORD 7	14
8	<REPLACEMENT SEGMENT6><KEY SEGMENT1>	+	GMASK8	⇒	SEARCH WORD 8	15

FIG. 6C

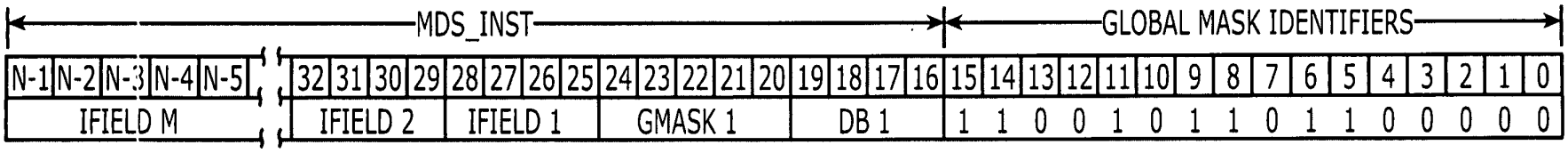

FIG. 6D

SEARCH NO.	SEARCH KEY	+	GLOBAL MASK	⇒	SEARCH WORD
1	<SEARCH KEY1>	+	GMASK1	⇒	SEARCH WORD 1
2	<SEARCH KEY2>	+	GMASK5	⇒	SEARCH WORD 2
3	<SEARCH KEY3>	+	GMASK6	⇒	SEARCH WORD 3
4	<SEARCH KEY4>	+	GMASK8	⇒	SEARCH WORD 4
5	<SEARCH KEY5>	+	GMASK9	⇒	SEARCH WORD 5
6	<SEARCH KEY6>	+	GMASK11	⇒	SEARCH WORD 6
7	<SEARCH KEY7>	+	GMASK14	⇒	SEARCH WORD 7
8	<SEARCH KEY8>	+	GMASK15	⇒	SEARCH WORD 8

FIG. 6E